REGULATORY GUIDE

NEBRASKA DEPARTMENT OF HEALTH AND HUMAN SERVICES
REGULATION AND LICENSURE

REGULATORY GUIDE 4.0

INSTRUCTIONS FOR RECORDING AND REPORTING OCCUPATIONAL RADIATION EXPOSURE DATA

A. INTRODUCTION

180 NAC 4, "Standards for Protection Against Radiation," requires licensees to provide radiation monitoring for all occupationally exposed individuals who might receive a dose in excess of 10 percent of the limits in 180 NAC 4-005, 4-011, or 4-012. In 180 NAC 4-052, licensees are required to maintain records of the radiation exposures of all individuals for whom personnel monitoring is required (pursuant to 180 NAC 4-022). According to 180 NAC 4-009, the dose in the current monitoring year must be determined for all persons who must be monitored, and this information must be recorded on Agency Form NRH-1 or equivalent. In addition, 180 NAC 4-009 requires that, prior to allowing an individual to participate in a planned special exposure, records of all prior exposures must be acquired. Records of prior dose must be maintained on Agency Form NRH-1 or its equivalent. Further, 180 NAC 4-062 requires certain licensees to submit an annual report to the Agency of the results of individual monitoring.

This guide describes an acceptable program for the preparation, retention, and reporting of records of occupational radiation exposures. It includes copies of Agency Forms NRH-1 and 2 and detailed instructions on completing them.

B. DISCUSSION

This guide is structured to reflect the process a licensee would go through in deciding whether or not monitoring for occupational exposure to radiation is required under the revised 180 NAC 4. The guide describes acceptable methods for determination of prior exposures, records of monitoring provided, and reporting that are needed to comply with 180 NAC 4.

In order to avoid confusion with the acronym for effective dose equivalent (EDE), the abbreviation LDE is used to represent the eye (lens) dose equivalent, as defined in 180 NAC 1-002. The term total organ dose

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equivalent (TODE) has been added, and it means the sum of the deep dose equivalent and the committed dose equivalent to the organ receiving the highest dose as described in 180 NAC 4-052.01, item 6.

C. REGULATORY POSITION

1. DETERMINATION OF MONITORING REQUIREMENTS

According to 180 NAC 4-022, if an adult is likely to receive in 1 year a dose greater than 10 percent of any applicable limit, monitoring is required. The licensee should perform an evaluation of the dose the individual is likely to receive prior to allowing the individual to receive the dose. This evaluation need not be made for every individual; evaluations can be made for employees with similar job functions or work areas.

1.1 If Monitoring Is Not Required

If this prospective evaluation shows that the individual is not likely to exceed 10 percent of any applicable limit, there are no record keeping or reporting requirements in regard to the individual's exposure. For individuals who received exposure at other facilities in the current year, the previous dose need not be considered in this prospective evaluation. Only dose that could be received at the facility performing the evaluation need be considered when determining the need for monitoring and, therefore, the record keeping and reporting requirements. If it is determined that monitoring is not required and a subsequent evaluation shows that the 10 percent threshold has or will be exceeded, the dose received when monitoring was not provided should be estimated, recorded, and reported. These estimates can be based on any combination of work location radiation monitoring or survey results, monitoring results of individuals in similar work situations, or other estimates to produce a "best estimate" of the actual dose received.

If monitoring is not required to demonstrate compliance with all limits but is required relative to one or more specific limits, the licensee should enter "NR" in the blocks on Agency Forms NRH-1 and 2 to indicate the areas for which monitoring was not required (e.g., extremity or skin doses). Where monitoring was provided but not measurable, the licensee should enter "ND" for "Not Detectable."

1.2 If Monitoring Is Required

If the prospective evaluation shows that the individual is likely to exceed 10 percent of an applicable limit, monitoring is required (180 NAC 4-022). Recording and reporting of the results of monitoring performed, regardless of the actual dose received, is required by 180 NAC 4-062.01 and 4-62.02 respectively.

1.3 Documentation of Prior Exposures

For those individuals for whom monitoring is required, determination of current year exposure at other facilities is required by 180 NAC 4-008. To document the determination of current year exposure, the individual to be monitored must provide an Agency Form NRH-1 signed by the individual or a written statement that includes the names of all facilities that provided monitoring for occupational exposure to radiation during the current year and an estimate of the dose received. Although not required by the regulations, it is considered good health physics practice to verify the information provided by the individual. Verification may be documented with:

- An Agency Form NRH-2 for each listed monitoring period, or
- Electronic, telephone, or facsimile transfer of dose data provided by licensees listed on the written statement, or
- An Agency Form NRH-1 countersigned by a licensee or current employer.

In addition, 180 NAC 4-009.01, item 2 requires that licensees attempt to obtain the records of lifetime cumulative occupational radiation dose. To demonstrate compliance with this requirement, the individual to be monitored may provide a written estimate of the cumulative lifetime dose or an up-to-date Agency Form NRH-1 signed by the individual. This information need not be verified so long as the individual does not participate in a planned special exposure.

Agency Forms NRH-1 and 2 and termination letters or reports, which report the results of monitoring prior to implementation of the revised 180 NAC 4, may be used without recalculating dose according to the requirements of the revised 180 NAC 4. For the purpose of assessing prior dose, whole body dose in rem as reported on the old (1988 or earlier) Agency Forms NRH-1 and 2 can be considered equivalent to total effective dose equivalent (TEDE).

1.4 Records of Prior Exposure for Persons Participating in Planned Special Exposures

If there are any periods of exposure during the life of the monitored individual that have not been determined and documented, participation in a planned special exposure is not permitted. Acceptable documentation of prior exposure is similar to that required for documenting current year exposure.

2. RECORDS OF MONITORING RESULTS FOR INDIVIDUALS FOR WHOM MONITORING IS REQUIRED

The preparation of Agency Form NRH-2 with the information clearly and legibly shown, or the collection of all the information requested by Agency Form NRH-2, is required by 180 NAC 4-052. Such a record must be maintained for each individual for whom personnel monitoring is required by 180 NAC 4-022. In addition, certain classes of licensees report the results of this monitoring to the Agency pursuant to 180 NAC 4-062 by submitting copies of Agency Form NRH-2. This report is filed annually. Instructions and additional information pertinent to each item are contained on Agency Form NRH-2.

2.1 Multiple Badges

2.2 Dose Calculations for CDE and TODE to the Maximally Exposed Organ

Licensees are required by 180 NAC 4-062.01, item 6 to record the total organ dose equivalent (TODE), which is the sum of the deep dose equivalent (DDE) and the committed dose equivalent (CDE) to the organ receiving the highest dose. Organ doses need not be calculated if the committed effective dose equivalent (CEDE) does not exceed 1 rem and there are no overexposures in any dose category within the monitoring year, including doses previously reported by other licensees. In this case, the licensee may record "NC" for "Not Calculated" in items 16 and 18 on Agency Forms NRH-1 and 2. If during the course of the year the dose to date for the year exceeds 1 rem CEDE or the individual receives an overexposure in another dose category, the CDE to the maximally exposed organ must be calculated, recorded, and reported.

2.3 Dose to the Embryo/Fetus

A declared pregnant worker is a worker who has voluntarily informed her employer in writing of her pregnancy and the estimated month and year of conception. The embryo/fetus' dose for the entire gestation period must be recorded (180 NAC 1-004.46D), but need not be included on Agency Forms NRH-1 and 2. Multiple records are not required in the case of twins, triplets, etc. Any dose measured to demonstrate compliance with 180 NAC 1-004.13 must be recorded.

Licensees should be sensitive to the issue of personal privacy with regard to embryo/fetus dose. If requested by the monitored woman, a letter report may be provided to subsequent licensees to document prior embryo/fetus dose.

2.4 Transmittal of Reports to the Agency

Certain licensees are required by 180 NAC 4-062.03 to submit reports of monitoring for the previous year to the Agency on or before April 30. These reports should be sent to:

Nebraska Department of Health and Human Services
Regulation and Licensure, Public Health Assurance Division
301 Centennial Mall South
P.O. Box 95007
Lincoln, NE 68509-5007

According to 180 NAC 4-062.02, "The licensee shall use Agency Form NRH-2 or electronic media containing all the information required by Agency Form NRH-2."

D. IMPLEMENTATION

The purpose of this section is to provide information to applicants and licensees regarding the Agency staff's plan for using this regulatory guide.

Except in those cases in which an applicant proposes an acceptable alternative method for complying with specified portions of the Agency's regulations, the methods described in this guide will be used in the evaluation of applications for new licenses, license renewals, and license amendments and for evaluating compliance with Title 180 NAC 4.

Nebraska Department of Health and Human Services Regulation and Licensure

CUMULATIVE OCCUPATIONAL EXPOSURE HISTORY

NRH-1
Effective Date July 22, 2001

1. NAME (LAST, FIRST, MIDDLE INITIAL)	2. IDENTIFICATION NUMBER	3. ID TYPE	4. SEX MALE ☐ FEMALE ☐	5. DATE OF BIRTH

6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE

19. SIGNATURE OF MONITORED INDIVIDUAL	20. DATE SIGNED	21. CERTIFYING ORGANIZATION	22. SIGNATURE OF DESIGNEE	23. DATE SIGNED

INSTRUCTIONS AND ADDITIONAL INFORMATION PERTINENT TO THE COMPLETION OF NRH-1
(All doses should be stated in rems)

1. Type or print the full name of the monitored individual in the order of last name (include "Jr," "Sr," "III," etc.), first name, middle initial (if applicable).

2. Enter the individual's identification number, including punctuation. This number should be the 9-digit social security number if at all possible. If the individual has no social security number, enter the number from another official identification such as a passport or work permit.

3. Enter the code for the type of identification used as shown below:

CODE	ID TYPE
SSN	U.S. Social Security Number
PPN	Passport Number
CSI	Canadian Social Insurance Number
WPN	Work Permit Number
IND	INDEX Identification Number
OTH	Other

4. Check the box that denotes the sex of the individual being monitored.

5. Enter the date of birth of the individual being monitored in the format MM/DD/YY.

6. Enter the monitoring period for which this report is filed. The format should be MM/DD/YY - MM/DD/YY.

7. Enter the name of the licensee, registrant, or facility not licensed by the Agency that provided monitoring.

8. Enter the Agency license or registration number or numbers.

9. Place an "X" in Record, Estimate, or No Record. Choose "Record" if the dose data listed represent a final determination of the dose received to the best of the licensee's or registrant's knowledge. Choose "Estimate" only if the listed dose data are preliminary and will be superseded by a final determination resulting in a subsequent report. An example of such an instance would be dose data based on self-reading dosimeter results and the licensee or registrant intends to assign the record dose on the basis of TLD results that are not yet available.

10. Place an "X" in either Routine or PSE. Choose "Routine" if the data represent the results of monitoring for routine exposures. Choose "PSE" if the listed dose data represents the results of monitoring of planned specialexposures received during the monitoring period. If more than one PSE was received in a single year, the licensee should sum them and report the total of all PSEs.

11. Enter the deep dose equivalent (DDE) to the whole body.

12. Enter the eye dose equivalent (LDE) recorded for the lens of the eye.

13. Enter the shallow dose equivalent recorded for the skin of the whole body (SDE,WB).

14. Enter the shallow dose equivalent recorded for the skin of the extremity receiving the maximum dose (SDE,ME).

15. Enter the committed effective dose equivalent (CEDE).

16. Enter the committed dose equivalent (CDE) recorded for the maximally exposed organ.

17. Enter the total effective dose equivalent (TEDE). The TEDE is the sum of items 11 and 15.

18. Enter the total organ dose equivalent (TODE) for the maximally exposed organ. The TODE is the sum of items 11 and 16.

19. Signature of the monitored individual. The signature of the monitored individual on this form indicates that the information contained on the form is complete and correct to the best of his or her knowledge.

20. Enter the date this form was signed by the monitored individual.

21. [OPTIONAL] Enter the name of the licensee, registrant or facility not licensed by the Agency, providing monitoring for exposure to radiation (such as a DOE facility) or the employer if the individual is not employed by the licensee or registrant and the employer chooses to maintain exposure records for its employees.

22. [OPTIONAL] Signature of the person designated to represent the licensee, registrant or employer entered in item 21. The licensee, registrant or employer who chooses to countersign the form should have on file documentation of all the information on the Agency Form Y being signed.

23. [OPTIONAL] Enter the date this form was signed by the designated representative.

Nebraska Department of Health and Human Services Regulation and Licensure

OCCUPATIONAL EXPOSURE RECORD FOR A MONITORING PERIOD

NRH-2
Effective Date July 22, 2001

1. NAME (LAST, FIRST, MIDDLE INITIAL)	2. IDENTIFICATION NUMBER	3. ID TYPE	4. SEX MALE_____ FEMALE_____	5. DATE OF BIRTH

6. MONITORING PERIOD	7. LICENSEE OR REGISTRANT NAME	8. LICENSE OR REGISTRATION NUMBER(S)	9A.		9B.	
				RECORD		ROUTINE
				ESTIMATE		PSE

INTAKES

10A. RADIONUCLIDE	10B. CLASS	10C. MODE	10D. INTAKE IN □Ci

DOSES (in rem)

DEEP DOSE EQUIVALENT (DDE)	11.
EYE DOSE EQUIVALENT TO THE LENS OF THE EYE (LDE)	12.
SHALLOW DOSE EQUIVALENT, WHOLE BODY (SDE,WB)	13.
SHALLOW DOSE EQUIVALENT, MAX EXTREMITY (SDE,ME)	14.
COMMITTED EFFECTIVE DOSE EQUIVALENT (CEDE)	15.
COMMITTED DOSE EQUIVALENT, MAXIMALLY EXPOSED ORGAN (CDE)	16.
TOTAL EFFECTIVE DOSE EQUIVALENT (BLOCKS 11+15) (TEDE)	17.
TOTAL ORGAN DOSE EQUIVALENT, MAX ORGAN (BLOCKS 11+16) (TODE)	18.

19. COMMENTS

20. SIGNATURE -- LICENSEE OR REGISTRANT	21. DATE PREPARED

INSTRUCTIONS AND ADDITIONAL INFORMATION PERTINENT TO THE COMPLETION OF NRH-2
(All doses should be stated in rems)

1. Type or print the full name of the monitored individual in the order of last name (include "Jr," "Sr," "III," etc.), first name, middle initial (if applicable).

2. Enter the individual's identification number, including punctuation. This number should be the 9-digit social security number if at all possible. If the individual has no social security number, enter the number from another official identification such as a passport or work permit.

3. Enter the code for the type of identification used as shown below:

CODE	ID TYPE
SSN	U.S. Social Security Number
PPN	Passport Number
CSI	Canadian Social Insurance Number
WPN	Work Permit Number
IND	INDEX Identification Number
OTH	Other

4. Check the box that denotes the sex of the individual being monitored.

5. Enter the date of birth of the individual being monitored in the format MM/DD/YY.

6. Enter the monitoring period for which this report is filed. The format should be MM/DD/YY - MM/DD/YY.

7. Enter the name of the licensee or registrant.

8. Enter the Agency license or registration number or numbers.

9A. Place an "X" in Record or Estimate. Choose "Record" if the dose data listed represent a final determination of the dose received to the best of the licensee's or registrant's knowledge. Choose "Estimate" only if the listed dose data are preliminary and will be superseded by a final determination resulting in a subsequent report. An example of such an instance would be dose data based on self-reading dosimeter results and the licensee intends to assign the record dose on the basis of TLD results that are not yet available.

9B. Place an "X" in either Routine or PSE. Choose "Routine" if the data represent the results of monitoring for routine exposures. Choose "PSE" if the listed dose data represents the results of monitoring of planned special exposures received during the monitoring period. If more than one PSE was received in a single year, the licensee or registrant should sum them and report the total of all PSEs.

10A. Enter the symbol for each radionuclide that resulted in an internal exposure recorded for the individual, using the format "Xx-###x," for instance, Cs-137 or Tc-99m.

10B. Enter the lung clearance class as listed in Appendix B to Part D (D, W, Y, V, or O for other) for all intakes by inhalation.

10C. Enter the mode of intake. For inhalation, enter "H." For absorption through the skin, enter "B." For oral ingestion, enter "G." For injection, enter "J."

10D. Enter the intake of each radionuclide in □Ci.

11. Enter the deep dose equivalent (DDE) to the whole body.

12. Enter the eye dose equivalent (LDE) recorded for the lens of the eye.

13. Enter the shallow dose equivalent recorded for the skin of the whole body (SDE,WB).

14. Enter the shallow dose equivalent recorded for the skin of the extremity receiving the maximum dose (SDE,ME).

15. Enter the committed effective dose equivalent (CEDE) or "NR" for "Not Required" or "NC" for "Not Calculated".

16. Enter the committed dose equivalent (CDE) recorded for the maximally exposed organ or "NR" for "Not Required" or "NC" for "Not Calculated".

17. Enter the total effective dose equivalent (TEDE). The TEDE is the sum of items 11 and 15.

18. Enter the total organ dose equivalent (TODE) for the maximally exposed organ. The TODE is the sum of items 11 and 16.

19. Signature of the person designated to represent the licensee or registrant.

20. Enter the date this form was prepared.

21. COMMENTS.
In the space provided, enter additional information that might be needed to determine compliance with limits. An example might be to enter the note that the SDE,ME was the result of exposure from a discrete hot particle. Another possibility would be to indicate that an overexposed report has been sent to the Agency in reference to the exposure report.